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ABSTRACT

The World Institute of Computer Assisted Teaching (WICAT) system was installed in November 1985 at the Salina and Fordson Schools in Dearborn, Michigan, and selected students in grades two, three, and four received their regular reading and/or mathematics instruction in the WICAT computer laboratory. Achievement gains of these students were measured using the Metropolitan Achievement Test (METRO), the Iowa Tests of Basic Skills (ITBS), and the Michigan Educational Assessment Program (MEAP). Analyses of the test results indicated that students who had received WICAT instruction had significant achievement gains in mathematics and reading. The percentage of grade four students mastering reading skills increased from an average of 42.2 before WICAT to 51.2 after WICAT, and, in September 1987, 60.5% attained mastery. The average mathematics gains for second grade students increased 150 percent from a gain of 8 months to a gain of 12 grade equivalent months. Gains in third grade mathematics increased 143%, from 7 to 10 months. Low achieving mathematics students benefitted the most from the WICAT program, with gain scores of up to 14 months during one school year. One-year ITBS reading gains remained the same as before WICAT with gains of 8, 8, and 10 months respectively for second, third, and fourth grade students. Three-year METRO/ITBS mathematics gains were significant for grade four WICAT students when compared with the gains of similar non-WICAT students in other Dearborn schools. The test scores and other evaluation data are displayed in eight tables and in extensive appendixes. (EW)

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EVALUATION OF STUDENT READING AND MATHEMATICS WICAT COMPUTER MANAGED INSTRUCTIONAL PROGRAM SALINA ELEMENTARY SCHOOL NOVEMBER, 1985 THROUGH JUNE, 1988

Office of Research and Evaluation
Public Schools
Dearborn, Michigan

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TABLE OF CONTENTS

	Page
Brief Summary	1
Background	1
Evaluation Design	2
Student WICAT Participation by Curriculum Areas	2
Assessment Instruments	4
Analysis of Test Data	5
Grade Four MEAP	6
One-Year Achievement	7
Three-Year Achievement	8
Summary	12

TABLE

I	Number of Students that Participated in WICAT	3
II	Salina Grade Equivalent Norms	5
III	Salina Grade Four MEAP	6
IV	Lowrey, McDonald and Woodworth Grade Four MEAP	7
V	Salina Achievement Gains Before and After WICAT	7
VI	One-Year Achievement WICAT vs. NON-WICAT	9
VII	One-Year Gains by Achievement Level WICAT vs. NON-WICAT	10
VIII	Three-Year Achievement WICAT vs. NON-WICAT	11

APPENDIX

Grade Two ITBS Reading and Math by School	A
Grade Three ITBS Reading and Math by School	B
Grade Four ITBS Reading and Math by School	C
Grade Two ITBS Reading by Achievement Level	D
Grade Two ITBS Math by Achievement Level	E
Grade Three ITBS Reading by Achievement Level	F
Grade Three ITBS Math by Achievement Level	G
Grade Four ITBS Reading by Achievement Level	H
Grade Four ITBS Math by Achievement Level	I
Three-Year METRO/ITBS Achievement by School	J
Three-Year METRO/ITBS Reading by Achievement Level	K
Three-Year METRO/ITBS Math by Achievement Level	L
Grade Three ITBS Achievement by Gender	M
Grade Three ITBS Achievement by Level	N
Grade Four ITBS Achievement by Gender	O
Grade Four ITBS Achievement by Level	P
Three-Year METRO/ITBS Achievement by Gender	Q
Three-Year METRO/ITBS Achievement by Level	R
Partial District by School Grade Three Achievement (Grade Two, Level 7)	S
Partial District by School Grade Three Achievement (Grade Two, Level 8)	T
District by School Grade Four Achievement	U

EVALUATION OF STUDENT READING AND MATHEMATICS
WICAT COMPUTER MANAGED INSTRUCTIONAL PROGRAM
SALINA ELEMENTARY SCHOOL
NOVEMBER, 1985 THROUGH JUNE, 1988

BRIEF SUMMARY

Salina students who received WICAT instruction show significant achievement in reading and mathematics.

The percentage of students mastering the reading skills as assessed by the grade four Michigan Educational Assessment Program increased from an average of 42.2 before WICAT to 51.2 after WICAT. In September, 1987, 60.5 percent attained mastery.

The average mathematics gains increased 150 percent from a prior WICAT gain of 8 months to a post WICAT gain of 12 grade equivalent months for students in the second grade. Third grade mathematics increased 143 percent with gains from 7 months to 10 months as assessed by the Iowa Tests of Basic Skills.

Low achieving mathematics students benefited the most from participation in the WICAT program with gain scores up to 14 months during one school year.

One-year ITBS reading gains remained the same as before WICAT with gains of 8, 8 and 10 months, respectively, for second, third and fourth grade students.

Three-year METRO/ITBS mathematics gains were significant for grade four WICAT students when compared to similar non-WICAT students in other Dearborn schools.

BACKGROUND

The World Institute of Computer Assisted Teaching (WICAT) is an example of a computer-based and managed instructional program. The computer is used to deliver instructional content directly to the student. The individualized instruction responds to students, provides more challenging materials as students master the concepts, is interactive and incremented, and gives constant reinforcement. While building upon student success, it implies strong pedagogy methods.

Research studies on the effects of computer-based instruction in elementary schools have shown positive gains. Generally, small but significant improvement in student achievement scores are produced, especially in the content area of mathematics.

Activities such as drill and practice, tutoring, simulation, and problem solving are normal instructional components of WICAT. In some schools the computer-based instruction is offered in addition to or as a supplement to the traditional instruction. In other sites, the computer-based instruction replaces or substitutes the traditional instruction in whole or in part. In this study elementary students participated in WICAT instruction as a replacement for the traditional instruction for about twenty minutes three of four times weekly.

The WICAT system was installed during November, 1985 at Salina School. Classroom teachers received training in the utilization of the WICAT system at that time. New teachers were inserviced at the beginning of each new school year.

This report summarizes the results of student achievement in reading and mathematics from May, 1985 through May, 1988. "Same" student test data provide the basis for the evaluation of the WICAT program.

EVALUATION DESIGN

The focus of the WICAT student achievement evaluation plan centered upon one-year and three-year student achievement in reading and/or mathematics. There is no casual relationship between the WICAT system and observed changes in student achievement. The results of the evaluation are generally attributed to the total reading and mathematics programs.

A pre- and posttesting of student achievement evaluation design was utilized via the district annual spring testing program so that no additional testing of students was necessary.

The establishment of experimental and control groups of students for research and evaluation purposes was not feasible because nearly all of the students at Salina School received WICAT instruction during the past three years.

Consequently, analysis of "same" student reading and/or mathematics achievement test data was employed as the basis of the WICAT student achievement evaluation.

The analysis of pre- post-student achievement data was made, whenever feasible, in regards to observed achievement growth compared to (a) prior achievement growth at Salina School, (b) normal achievement growth as revealed by national norms, (c) achievement growth of similar students in other Dearborn schools, (d) achievement levels as determined on the pretest, and (e) gender.

One-year student achievement analysis focused on gains from May, 1987 to May, 1988 for second, third and fourth grades. The three-year analysis was made on the group of current grade four students that received WICAT instruction for the longest time--since November, 1985.

Students received their regular reading and/or mathematics instruction in the WICAT computer laboratory. The WICAT curriculum as well as the level of placement into the curriculum was made by the professional judgment of their teacher and was, therefore, deemed as the most appropriate for the student. Consequently, no matter which WICAT curriculum the student received or the placement level of the student, the results of the WICAT evaluation would be generally attributed to the total reading and mathematics program.

STUDENT WICAT PARTICIPATION BY CURRICULUM AREAS

The installation of the WICAT system occurred in November, 1985 at both Salina and Fordson schools. Nearly 1100 students participated in the computer-based instruction in the WICAT laboratory by June, 1986 receiving twenty- to thirty-minute lessons normally three to four times weekly. Student participation in the WICAT curriculum increased to 1,280 by June, 1987 and to 1,405 by June, 1988. Refer to Table I. There was full utilization of the WICAT computer laboratory with all time slots filled.

TABLE I
NUMBER OF STUDENTS THAT PARTICIPATED
IN THE WICAT COMPUTER LAB
AT SALINA AND FORDSON SCHOOLS
BY WICAT CURRICULUM

1985-86 Spring Semester

Grade	Student Enrollment	Primary Reading	Read Comp	ESL*	Sec Lang Arts	Lang Arts	Chemistry	French	Math (K-8)	Middle School Math	Pre-Algebra	Total
K	93	22										
		10**										32
1	100	22		18					10**			50
2	100	106							3			109
3	75	12		21					74			107
4	69	21		1								22
5	74	1		4					28			33
6	75		28						53			81
7	71			4					52			56
8	58		26									26
9	485	13	39	4					165		84	305
10	455	38	126	4					4		9	181
11	398	4	14	4					7			29
12	370	1	13						42			56
Totals		250	246	60					438		93	1087

1986-87 School Year

Grade	Student Enrollment	Primary Reading	Read Comp	ESL*	Sec Lang Arts	Lang Arts	Chemistry	French	Math (K-8)	Middle School Math	Pre-Algebra	Total
K	112	26										26
		12**	15**	11**					12**			50**
1	96	97										97
2	96	96							96			192
3	99	85	13	1					99			198
4	75											
5	74									24		24
6	73		55							55		110
7	75											
8	72									76		76
9-12	1734	39	118		37	5		17	270		21	507
Totals		355	201	12	37	5		17	477	155	21	1280

1987-88 School Year

Grade	Student Enrollment	Primary Reading	Read Comp	ESL*	Sec Lang Arts	Lang Arts	Chemistry	French	Elem School Math	Middle School Math	Pre-Algebra	Total
		33**	2**						8**			43**
1	105	109	1									110
2	84	88							89			177
3	94	29	61						90			180
4	92	29	64						90			183
5	64		24							22		46
6	73		24							25		49
7	74											
8	73											
9-12	1768	62	136	26		7	102	73		189	22	617
Totals		350	312	26		7	102	73	277	236	22	1405

*ESL=English as a second language
**Special Education/ESL

All the students in a grade level that participated in WICAT were as follows:

School-Year	Grade	WICAT Curriculum
1985-86	2	Reading
	3	Mathematics
1986-87	1	Reading
	2	Reading and Mathematics
	3	Reading and Mathematics
	8	Mathematics
1987-88	1	Reading
	2	Reading and Mathematics
	3	Reading and Mathematics
	4	Reading and Mathematics

Note that the 1985-86 grade two students have participated in the WICAT Reading from November, 1985 through June, 1988 and in WICAT mathematics from September, 1986 through June, 1988 as grade four students. A separate three-year achievement analysis was made on these grade four students. Reading and mathematics results from May, 1987 to May, 1988 were analyzed for students in grades two, three and four.

ASSESSMENT INSTRUMENTS

Three nationally-normed standardized tests and one State-normed test were utilized in the evaluation of the WICAT program.

The Metropolitan Achievement Test (METRO), 1978 Edition, was administered to grades one and two students during May, 1985 and May, 1986. The new 1985 edition of the Iowa Tests of Basic Skills (ITBS), Form G, was utilized in May, 1987 and May, 1988 for grades one and two.

In grades three through six, the ITBS, 1978 edition, was administered in 1984-85 and in 1985-86. The 1985 edition of the ITBS was adopted as the district-required test and administered in 1986-87 and 1987-88.

The reading comprehension and total mathematics grade equivalent scores on both the METRO and ITBS were analyzed for the student achievement WICAT evaluation.

Comparisons on the percent of students attaining reading and mathematics skills on the grade four Michigan Educational Assessment Program (MEAP) were also made.

Student school ability was assessed by the grade three Cognitive Abilities Test (CogAT), Form 4, Level A.

The national grade equivalent norms are shown in Table II for the METRO and ITBS as administered at Salina Elementary School.

TABLE II
SALINA ELEMENTARY SCHOOL TESTING SCHEDULE
METROPOLITAN ACHIEVEMENT TEST (METRO)
IOWA TESTS OF BASIC SKILLS (ITBS)
GRADE EQUIVALENT NORMS

Grade	Test (Form)	Test Edition	1984-85	1985-86	1986-87	1987-88
1	METRO (JS)	1978	1.8	1.8	---	---
1	ITBS (G)	1985	---	---	1.8	1.8
2	METRO (JS)	1978	2.8	2.8	---	---
2	ITBS (G)	1985	---	---	2.8	2.8
3	ITBS (7)	1978	3.6	3.6	---	---
3	ITBS (G)	1985	---	---	3.8	3.8
4	ITBS (8)	1978	4.6	4.7	---	---
4	ITBS (H)	1985	---	---	4.8	4.8
5	ITBS (8)	1978	5.6	5.7	---	---
5	ITBS (G)	1985	---	---	5.8	5.8
6	ITBS (7)	1978	6.5	6.5	---	---
6	ITBS (H)	1985	---	---	6.5	6.8

Grade Equivalent Norms	Test Administration Month
.5	January
.6	March
.7	April
.8	May

Note: 1.8 is read as one year and eight months

ANALYSIS OF TEST DATA

Grades two, three and four (1987-88) students that received WICAT instruction at Salina School were the subjects in this research report on student achievement.

The sequence of reporting and analysis of student reading and mathematics achievement is as follows: grade four MEAP, one-year achievement growth and three-year achievement growth.

Whenever feasible, achievement gains were compared to normal gains as determined by national norms, prior achievement gains, achievement gains of similar students and district, as well as levels of achievement (i.e., low, middle-low, middle-high, and high achieving students) and gender.

Grade four MEAP results in Table III show significant positive gains in reading for Salina WICAT students and a small gain in mathematics.

MEAP Reading: With one and one-half years of WICAT instruction in reading, there was a substantial gain of 18.3 percent mastery in September 1987 MEAP results of 60.5 percent mastery compared to an average of 42.2 percent mastery for the three-year duration of 1983 thru 1985.

MEAP Mathematics: With one-half year of WICAT participation in mathematics, there was no appreciable difference in September 1986 MEAP results of 71.6 percent mastery compared to an average of 72.0 percent mastery for the previous three years.

However, with one year of WICAT participation in mathematics, there was a gain of 3.6 percent mastery in September 1987 MEAP results of 75.6 percent mastery compared to an average of 72.0 percent mastery over the period of 1983 through 1985.

TABLE III
SALINA ELEMENTARY SCHOOL
GRADE FOUR MEAP PERCENT MASTERY
WICAT WAS IMPLEMENTED IN NOVEMBER, 1985

	September	Reading	Mathematics	WICAT Curriculum and Grade Level Participation
Before WICAT	1983	33.8	75.3	
	1984	40.5	68.4	
	1985	52.3	72.3	1985-86 Grade 2 Reading) Grade 3 Math) 1/2 year
1983 to 1985 Average		42.2	72.0	
After WICAT	1986	41.8	71.6	1986-87 Grade 2 Reading and Math Grade 3 Reading and Math
	1987	60.5	75.6	1987-88 Grade 2 Reading and Math Grade 3 Reading and Math Grade 4 Reading and Math
1986 to 1987 Average		51.2	73.6	
Average Gain from 1983-85 to 1986-87		+ 9.0	+ 1.6	

Another method of comparison is to examine achievement gains of similar students. Grade four (1987-88) students at Salina, Lowrey, McDonald and Woodworth, for example, have similar school ability with 95, 98, 97 and 104 mean standard age scores as assessed by the Cognitive Abilities Test. Ethnic characteristics of students in four schools are also similar.

Non-WICAT MEAP: Compared to similar non-WICAT students, the Salina average gain of +9.0 in MEAP reading from before WICAT to after WICAT are as same as or better than Lowrey (+2.4), McDonald (+9.9) and Woodworth (+6.7). Refer to Table IV.

TABLE IV
LOWREY, MCDONALD AND WOODWORTH ELEMENTARY SCHOOLS (NON-WICAT)
GRADE FOUR MEAP PERCENT MASTERY

	Lowrey		McDonald		Woodworth		District	
September	Reading	Math	Reading	Math	Reading	Math	Reading	Math
1983	68.1	85.5	50.7	73.3	79.3	86.2	72.3	85.3
1984	69.6	88.6	54.4	64.7	78.9	84.2	73.6	83.1
1985	56.5	87.1	46.2	61.5	78.7	73.9	72.0	81.9
1983 to 1985 Average	64.7	87.1	50.4	66.5	79.0	81.4	72.6	83.4
1986	80.5	93.9	55.6	70.4	78.6	88.1	79.4	90.6
1987	53.7	84.2	65.0	70.0	92.7	95.1	74.4	86.2
1986 to 1987 Average	67.1	89.1	60.3	70.2	85.7	91.6	76.9	88.4
Average Gain from 1983-85 to 1986-87	+2.4	+2.0	+9.9	+3.7	+6.7	+10.2	+4.3	+5.0

"Same" Student Analysis: There are three types of students that are normally included in pretest to posttest test data analysis from May, 1987 to May, 1988. First, there are the students that were both pretested and posttested and, therefore, received instruction throughout the school year. These "same" students are the group of students that participated in WICAT and were used for achievement analysis in the research study. Second, the students that were pretested but left the school and were not posttested. Therefore, the "pretest only" students were not included in the analysis. The third group of students were only posttested because they entered school sometime after the pretest. The "posttest only" students were also not included in the data for the evaluation.

Spring to spring school or district achievement scores typically include all three types of students. Consequently, achievement trend data may be somewhat biased. Therefore, in the analysis of instructional programs it is important and more accurate to base an analysis only on "same" student data.

One-year achievement grade-equivalent gains of Salina grades two, three and four students from May, 1987 to May, 1988 show reading gains from .8 (eight months) to 1.0 (one year and zero months) as shown in Table V. These same students had mathematics gains from 1.0 to 1.2 which were at or above the expected national gain of 1.0. This is significant because prior achievement gains for Salina students were less than one year in grades 2 and 3.

During 1981 through 1985, the years before WICAT was implemented, Salina student achievement average METRO and ITBS grade equivalent gains from the prior year were as follows compared to achievement gains from May, 1987 to May, 1988:

TABLE V
SALINA STUDENT ACHIEVEMENT GAINS

	Before WICAT May, 1981 to May, 1985		After WICAT May, 1987 to May, 1988	
	Reading	Mathematics	Reading	Mathematics
Grade 2	.8	.8	.8	1.2
Grade 3	.8	.7	.8	1.0
Grade 4	1.0	1.1	1.0	1.1

Salina students who participated in WICAT instruction had the same achievement gains in reading as students did prior to WICAT as assessed by the ITBS. In mathematics an increased achievement gain was evident especially for students in grades two and three. A greater than normal mathematics achievement gain occurred when compared to a national gain of 1.0.

Achievement Trends: Salina achievement gains over time in a comparison of before WICAT to after WICAT is very revealing in the area of mathematics.

If we assume that achievement gains for before and after WICAT are accumulative and that the grade one mathematics score was 1.7, the before WICAT achievement would be 2.5 in grade 2, 3.2 in grade 3 and 4.3 in grade 4. The after WICAT achievement would be 2.9 in grade 2, 3.9 in grade 3 and 5.0 in grade 4. This result is an increase of achievement growth of seven months (from 4.3 to 5.0) by the end of the fourth grade.

Salina student reading gains are similar to comparable student gains at Lowrey, McDonald and Woodworth with the exception of grade four students at Woodworth who had a gain of 1.4 during the one-year period. Refer to Table VI. Compared to similar students, Salina students had mathematics gains of about the same or better than non-WICAT students, especially at grade three. Again, this is a substantial improvement since prior to WICAT the average Salina mathematics gain was only eight months.

Achievement Levels: To help answer the question of which students benefited most from WICAT instruction, an analysis was made on the achievement levels of the students. See Table VII. Based upon the pretest, students were classified into one of four categories: low (1 to 24 percentile scores), middle-low (25 to 49), middle-high (50 to 74) and high (75 to 99).

When the achievement levels of Salina students were analyzed, the greatest reading and mathematics gains occurred for low achieving students ranging from .9 to 1.4. The smallest gains were evident for the high achieving students. Achievement level gains of WICAT students generally were as great as non-WICAT students in reading and mathematics. Refer to Table VII.

Gender: When student achievement was analyzed by gender in general, there were no significant differences between boys and girls. The one exception was third grade students at Salina in the area of mathematics. Third grade girls had a gain of .8 compared to a gain of 1.2 in mathematics for boys. A similar difference between the genders was not evident for non-WICAT students.

Three-year achievement for grade four Salina WICAT students shows about the same gains in reading and larger gains in mathematics when compared to similar non-WICAT students as reported in Table VIII.

Grade four Salina students with WICAT participation had an achievement gain in reading of about the same as students in non-WICAT experience at Lowrey, McDonald and Woodworth. This is significant because historically achievement gains of Salina students have not been as high as in comparable Dearborn schools and below district average gains.

Salina mathematics achievement gain (2.7) was greater than non-WICAT students (2.1 to 2.5) and the district (2.4). This is a significant mathematics growth because even though the students were four to five months behind the grade one students at Lowrey and McDonald, by the end of fourth grade they were achieving at the same level.

TABLE VI
ONE-YEAR SUMMARY OF
WICAT VS NON-WICAT SCHOOLS
ITBS ACHIEVEMENT
GRADE EQUIVALENT SCORES
MAY 1987 TO MAY 1988

		Reading			Mathematics		
School	N	Pre	Post	Gain	Pre	Post	Gain
Grade Two							
Salina*	72	1.6	2.4	.8	1.3	2.4	1.2
Lowrey	83	1.7	2.3	.6	1.4	2.4	1.0
McDonald	56	1.9	2.6	.7	1.4	2.6	1.3
Woodworth	29	1.9	2.7	.8	1.6	2.8	1.3
District**	254	1.8	2.4	.7	1.4	2.5	1.1
Grade Three							
Salina*	75	2.3	3.0	.8	2.4	3.4	1.0
Lowrey	86	2.4	3.2	.8	2.3	3.2	.9
McDonald	49	2.5	3.3	.8	2.5	3.5	1.0
Woodworth	27	2.2	3.2	1.0	2.4	3.2	.8
District**	299	2.5	3.3	.8	2.5	3.4	.9
Grade Four							
Salina*	81	2.9	3.9	1.0	3.3	4.4	1.1
Lowrey	81	3.2	4.1	.9	3.3	4.4	1.1
McDonald	58	3.2	4.4	1.2	3.4	4.5	1.1
Woodworth	37	3.6	5.0	1.4	3.5	4.7	1.1
District	756	3.5	4.6	1.1	3.6	4.7	1.1

*Only Salina grades two, three and four students participated in the WICAT reading and mathematics program during the 1987-88 school year.

**Partial district results include some students who transferred to other Dearborn schools for the posttest.

Note: A complete summary of student data including the mean, standard deviation and range of scores can be found in the appendix.

TABLE VII
ONE-YEAR SUMMARY OF
WICAT VS NON-WICAT SCHOOL
BY ITBS ACHIEVEMENT LEVEL GAINS
GRADE EQUIVALENT SCORES
MAY 1987 TO MAY 1988

	Reading					Mathematics				
School	L *	ML	MH	H	Total	L	ML	MH	H	Total
Grade Two										
Salina**	.9	.7	.9	.6	.8	1.4	.9	.9	---	1.2
Lowrey	.3	.7	.7	.2	.6	1.3	.9	.8	.6	1.0
McDonald	.7	.8	.6	.8	.7	1.5	.9	1.3	.8	1.3
Woodworth	.6	1.0	.8	.7	.8	1.6	1.4	.8	.5	1.3
District***	.6	.7	.7	.6	.7	1.4	1.0	.9	.6	1.1
Grade Three										
Salina**	1.0	.7	.6	.1	.8	1.0	1.1	.8	.8	1.0
Lowrey	.7	.8	.9	.8	.8	1.0	.9	.7	.6	.9
McDonald	.9	.8	.5	.7	.8	1.1	1.1	.8	.6	1.0
Woodworth	1.0	1.2	1.4	-.1	1.0	.8	1.1	.8	.2	.8
District***	1.0	.8	.8	.3	.8	1.0	1.0	.8	.6	.9
Grade Four										
Salina*	1.2	.9	.7	1.1	1.0	1.3	1.0	1.0	.6	1.1
Lowrey	1.1	.7	1.0	.3	.9	1.1	1.2	1.1	1.0	1.1
McDonald	1.4	1.1	1.2	1.1	1.2	1.1	1.1	1.2	1.3	1.1
Woodworth	1.3	1.6	1.5	.9	1.4	1.1	1.4	.9	1.2	1.1
District***	1.2	1.0	1.2	.9	1.1	1.1	1.1	1.0	.9	1.1

*Achievement Levels
L = Low (1 to 24%ile) MH = Middle High (50 to 74%ile)
ML = Middle Low (25 to 49%ile) H = High (75 to 99%ile)

**Only Salina grades two, three and four students participated in the WICAT reading and mathematics program during the 1987-88 school year.

***Partial district results include some students who transferred to other Dearborn schools for the posttest.

TABLE VIII
THREE-YEAR SUMMARY OF WICAT VS NON-WICAT
METRO/ITBS ACHIEVEMENT AND ACHIEVEMENT LEVEL GAINS
GRADE ONE MAY 1985 THROUGH GRADE FOUR MAY 1988
GRADE EQUIVALENT SCORES

	Reading					Mathematics				
	Pre	Post	Gain	Adj. Post	Adj. Gain	Pre	Post	Gain	Adj. Post	Adj. Gain
Salina*	1.6	4.0	2.3	4.4	2.7	1.8	4.5	2.7	4.7	2.9
Lowrey	1.8	4.1	2.3	4.5	2.7	2.3	4.4	2.1	4.6	2.3
McDonald	2.0	4.4	2.4	4.8	2.8	2.2	4.5	2.3	4.7	2.5
Woodworth	2.4	5.1	2.7	5.5	3.1	2.4	4.8	2.5	5.0	2.7
District	2.1	4.7	2.5	5.1	2.9	2.3	4.7	2.4	4.9	2.6

	Reading					Mathematics				
	L **	ML	MH	H	Total	L	ML	MH	H	Total
Salina	2.2	2.3	2.5	2.7	2.3	3.0	2.5	2.5	2.8	2.7
Lowrey	2.4	2.0	2.6	2.3	2.3	2.6	2.2	2.1	1.9	2.1
McDonald	2.6	2.9	2.2	2.4	2.4	2.8	2.5	2.3	2.1	2.3
Woodworth	3.7	2.8	2.5	2.9	2.7	3.4	2.3	2.5	2.3	2.5
District	2.5	2.4	2.6	2.6	2.5	3.1	2.5	2.4	2.2	2.4

*Only Salina students participated in the WICAT reading and/or mathematics curriculum beginning in November, 1985 through May, 1988.

**Achievement Levels
L = Low (1 to 24%ile) MH = Middle High (50 to 74%ile)
ML = Middle Low (25 to 49%ile) H = High (75 to 99%ile)

The adjusted (adj.) posttest and gain scores reflect the change in national norms from 1978 to 1985. The change in test instrument from the METRO to the ITBS was not corrected for in this study. Consequently, a comparison should not be made with normal national growth. A normal gain is 3.0 from grade one through grade four.

Achievement Levels: The gains by achievement levels were mixed for Salina and non-WICAT students. Reading gains ranged from 2.2 for low achieving up to 2.7 for high achieving Salina students. Note: the 3.7 low achieving reading gain for Woodworth represented test results for only one student.

In mathematics Salina had the largest gain of 3.0 for the low achieving followed by a gain of 2.8 for the high achieving students. In comparable schools, the largest gains in mathematics were also recorded for the low achieving students.

SUMMARY

The evaluation plan for the WICAT system focused on student and staff attitudes toward the computer-based instructional program as well as student achievement. Student and staff attitudes were assessed annually near the end of the school year from 1986 thru 1988 and were reported in separate Bulletins Nos. 1309, 1320 and 1341, respectively.

Enthusiasm for the WICAT system remains very high with three fourths of the students wanting to receive WICAT instruction again and would also recommend WICAT to their friends. Furthermore, about nine-out-of-ten teachers felt that WICAT instruction had a positive effect on the student learning and recommend the WICAT system to other teachers.

A separate research study was completed during the first semester of the 1987-88 school year with student reading and mathematics achievement at Fordson High School. Significant reading comprehension and mathematics gains were reported for high school students in Bulletin No. 1335.

The focus of this research was on reading and mathematics achievement of students that received WICAT instruction during the past year. Further analysis was made on those students that participated in the WICAT program since it was installed in November, 1985.

Pre- and posttesting of current (1987-88) grades two, three and four students provide a unique insight into their achievement growth in reading and mathematics as assessed by the ITBS. Since all of these students participated in both the WICAT reading and mathematics program, it was not possible to establish experimental and control groups for research purposes and analysis. Instead, pre- and posttesting "same" student achievement results were analyzed by a comparison of normal achievement growth (via national norms), prior achievement growth trends, achievement growth of similar students in other Dearborn schools, levels of achievement as determined on the pretest, and by gender.

Positive gains in the grade four MEAP reading were reported for Salina WICAT students while there were small gains in the MEAP mathematics. An increase of 18.3 percent mastery in reading skills occurred after one and one-half years of WICAT reading instruction. These MEAP reading gains were about the same or greater than similar students in other schools that did not have WICAT.

While the MEAP results show positive gains in reading, the ITBS results provide positive and significant achievement gains in mathematics.

Student achievement results for Salina students who received WICAT instruction in both reading and mathematics during the 1987-88 school year showed significant growth in the areas of reading comprehension and mathematics as assessed by the Iowa Tests of Basic Skills. Their growth in reading, however, was the same as occurred before WICAT. Mathematics grade equivalent gains, when compared to before WICAT, increased 150 percent for grade two students from .8 to 1.2 (an increase of .4 over and above prior growth rates) and increased 143 percent for grade three students with gain scores from .7 to 1.0.

It is significant that these students who participated in the WICAT program had a growth rate similar to all students in the district instead of losing about two grade equivalent months at the second and third grades.

The greatest achievement gains in mathematics occurred with the low achieving students. There was no significant difference recorded on the basis of gender.

Salina grade four students who received WICAT instruction in reading from November, 1985 through June, 1988 and in mathematics for the last year had about the same reading gains and significantly higher mathematics gains when compared to similar students in other schools who did not have the opportunity to participate in the WICAT program. The WICAT mathematics gain of 2.7 grade equivalent points was greater than non-WICAT students whose gains ranged from 2.1 to 2.5 and also greater than the district average of 2.5. This is a significant outcome regarding the importance of the WICAT system.

To summarize, students who received WICAT instruction had substantial growth in reading skills as assessed by the MEAP and had significant positive growth in mathematics as assessed by the ITBS. Low achieving mathematics students seem to have the greatest growth.

GRADE TWO STUDENT SUMMARY
WICAT VS. NON-WICAT ITBS STUDENT ACHIEVEMENT ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE ONE, MAY, 1987, PRETEST - ITBS, NORM=1.8
GRADE TWO, MAY, 1988, POSTTEST - ITBS, NORM=2.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest----			----Posttest-----			------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (97/ 84)*	72	1.6	.532	.3→3.3	2.4	.739	.7→5.0	.8	.528	-.3→2.6
Lowrey (112/109)	84	1.7	.511	.1→3.0	2.3	.874	.5→5.0	.6	.682	-.8→2.8
McDonald (66/ 64)	56	1.9	.578	.3→3.0	2.6	.796	1.1→5.0	.7	.544	-.2→2.5
Woodworth (33/ 37)	29	1.9	.548	.9→2.8	2.7	.919	.8→5.0	.8	.746	-.3→2.4
District**	254	1.8	.548	.1→3.3	2.4	.827	.5→5.0	.7	.619	-.8→2.8

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina	71	1.3	.495	.3→2.5	2.4	.541	.5→4.2	1.2	.514	.0→2.3
Lowrey	84	1.4	.699	.1→2.7	2.4	.590	1.1→3.6	1.0	.513	.0→2.3
McDonald	55	1.4	.683	.2→3.0	2.6	.708	1.5→4.2	1.3	.655	.0→2.9
Woodworth	29	1.6	.640	.6→3.0	2.8	.515	1.9→3.8	1.3	.658	.0→2.4
District	254	1.4	.625	.1→3.0	2.5	.613	.7→4.2	1.1	.578	.0→2.9

*The number of Salina students tested for pretest was 97 and posttest was 84. Analysis was made on 72 "same" students who were both pretested and posttested.

**Partial district includes some students who transferred to other Dearborn schools for the posttest.

GRADE THREE STUDENT SUMMARY
WICAT VS. NON-WICAT ITBS STUDENT ACHIEVEMENT ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WCIAT)
GRADE TWO, MAY, 1987, PRETEST - ITBS, NORM=2.8
GRADE THREE, MAY, 1988, POSTTEST - ITBS, NORM=3.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest-----			-----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (93/ 85)*	75	2.3	.830	.6→5.0	3.0	.957	.4→5.8	.8	.819	-1.7→3.3
Lowrey (109/115)	86	2.4	.745	.9→5.0	3.2	1.050	.9→5.8	.8	.713	-1.1→2.9
McDonald (58/ 55)	49	2.5	.696	.9→4.4	3.3	.915	1.6→5.8	.8	.756	-1.2→2.6
Woodworth (34/ 39)	27	2.2	.851	.7→5.0	3.2	1.092	.9→5.5	1.0	.795	- .5→3.1
District	297	2.6	.985	.6→6.0	3.3	1.061	.4→6.5	.8	.826	-2.4→3.3

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina	75	2.4	.533	1.3→3.7	3.4	.811	1.0→4.8	1.0	.637	-.8→2.6
Lowrey	86	2.3	.595	1.2→4.0	3.2	.780	1.8→5.0	.9	.611	-.8→2.3
McDonald	48	2.5	.620	1.1→3.9	3.5	.716	2.1→5.5	1.0	.597	-.3→2.6
Woodworth	26	2.4	.686	1.2→3.6	3.2	.757	1.8→4.2	.8	.601	-.1→2.1
District	297	2.5	.690	1.1→4.4	3.5	.841	1.0→6.3	.9	.623	-.8→2.6

*The number of Salina students tested for pretest was 93 and posttest was 85. Analysis was made on 75 "same" students who were both pretested and posttested.

**Partial district includes some students who transferred to other Dearborn schools for the posttest.

GRADE FOUR STUDENT SUMMARY
WICAT VS. NON-WICAT ITBS STUDENT ACHIEVEMENT ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE THREE, MAY, 1987, PRETEST - ITBS, NORM=3.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			------Gain--------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (97/ 84)*	81	2.9	.914	.7→5.8	3.9	.981	2.3→8.0	1.0	.771	- .5→3.6
Lowrey (86/102)	81	3.2	1.088	.7→6.5	4.1	1.179	1.7→6.8	.9	.834	- .9→2.6
McDonald (67/ 60)	58	3.2	.968	1.1→6.1	4.4	1.110	2.5→8.0	1.2	.765	- .4→3.3
Woodworth (42/ 41)	37	3.6	1.033	1.6→6.5	5.0	1.180	2.5→7.4	1.4	.798	- .1→3.8
District (852/855)	756	3.5	1.153	.7→7.9	4.6	1.301	1.5→8.9	1.1	.831	-1.7→3.9

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina	80	3.3	.846	1.6→6.1	4.4	.824	2.8→6.9	1.1	.546	- .4→2.7
Lowrey	81	3.3	.681	1.7→5.3	4.4	.820	2.6→6.1	1.1	.557	- .1→2.7
McDonald	58	3.4	.715	2.2→5.1	4.5	.877	3.0→6.5	1.1	.469	.1→2.2
Woodworth	37	3.5	.722	2.5→5.3	4.7	.825	2.6→6.5	1.1	.497	.0→2.2
District	755	3.7	.868	1.6→6.7	4.7	.934	2.6→7.7	1.1	.581	-1.0→3.1

*The number of Salina students tested for pretest was 97 and posttest was 84. Analysis was made on 81 "same" students who were both pretested and posttested.

GRADE TWO STUDENT SUMMARY
WICAT ITBS STUDENT READING ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE ONE, LEVEL 6, MAY, 1987, PRETEST - ITBS, NORM=1.8
GRADE TWO, LEVEL 7, MAY, 1988, POSTTEST - ITBS, NORM=2.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (93/ 84)*										
Low	15	.96	.290	.3→1.2	1.84	.585	.7→2.5	.88	.418	.1→1.4
Middle Low	37	1.57	.149	1.3→1.8	2.23	.394	1.5→3.4	.66	.383	-.2→1.8
Middle High	15	2.15	.146	1.9→2.4	3.08	.794	2.0→5.0	.93	.770	-.3→2.6
High	5	2.76	.372	2.5→3.3	3.32	.853	2.4→4.4	.56	.805	-.1→1.9
Total	72	1.64	.532	.3→3.3	2.39	.739	.7→5.0	.76	.528	-.3→2.6
Lowrey (109/109)										
Low	14	1.07	.289	.1→1.2	1.40	.560	.5→2.2	.34	.485	-.4→1.1
Middle Low	40	1.56	.132	1.3→1.8	2.21	.685	.9→4.0	.65	.633	-.7→2.3
Middle High	21	2.14	.172	1.9→2.4	2.79	.933	1.1→5.0	.65	.876	-.8→2.8
High	8	2.74	.169	2.5→3.0	2.98	.597	2.3→3.7	.24	.548	-.5→1.0
Total	83	1.73	.511	.1→3.0	2.28	.874	.5→5.0	.56	.682	-.8→2.8
McDonald (58/ 64)										
Low	5	.84	.313	.3→1.1	1.50	.283	1.1→1.9	.66	.241	.4→1.0
Middle Low	20	1.55	.128	1.3→1.8	2.32	.285	1.7→2.7	.77	.313	.1→1.2
Middle High	21	2.12	.184	1.9→2.4	2.70	.668	1.8→4.4	.57	.614	-.2→2.3
High	10	2.77	.189	2.5→3.0	3.60	.829	2.7→5.0	.83	.817	-.1→2.5
Total	56	1.92	.578	.3→3.0	2.61	.796	1.1→5.0	.69	.544	-.2→2.5
Woodworth (37/ 37)										
Low	4	1.05	.129	.9→1.2	1.60	.560	.8→2.1	.55	.575	-.2→1.2
Middle Low	11	1.58	.125	1.4→1.8	2.62	.760	1.4→4.0	1.04	.749	.0→2.4
Middle High	7	2.09	.168	1.9→2.3	2.84	.704	2.3→4.0	.76	.709	.3→2.1
High	7	2.63	.125	2.5→2.8	3.33	1.010	2.4→5.0	.70	.917	-.3→2.2
Total	29	1.88	.548	.9→2.8	2.70	.919	.8→5.0	.82	.746	-.3→2.4
District**										
Low	41	.99	.279	.1→1.2	1.59	.544	.5→2.5	.60	.476	-.4→1.4
Middle Low	112	1.56	.135	1.3→1.8	2.28	.558	.9→4.0	.72	.535	-.7→2.4
Middle High	67	2.12	.165	1.9→2.4	2.82	.779	1.1→5.0	.69	.736	-.8→2.8
High	31	2.73	.205	2.5→3.3	3.30	.818	2.3→5.0	.57	.778	-.5→2.5
Total	254	1.76	.548	.1→3.3	2.43	.827	.5→5.0	.68	.619	-.8→2.8

*The number of Salina students tested for pretest was 93 and posttest was 84. Analysis was made on 72 "same students" who were both pretested and posttested.

**Partial district includes some students who transferred to other Dearborn schools for the posttest.

GRADE TWO STUDENT SUMMARY
WICAT ITBS STUDENT MATHEMATICS ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE ONE, LEVEL 6, MAY, 1987, PRETEST - ITBS, NORM=1.8
GRADE TWO, LEVEL 7, MAY, 1988, POSTTEST - ITBS, NORM=2.8
GRADE EQUIVALENT SCORES

Total Mathematics

		-----Pretest-----			----Posttest-----			------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Low	41	.91	.289	.3→1.3	2.30	.537	.7→3.2	1.39	.422	.3→2.2
Middle Low	21	1.63	.142	1.5→1.8	2.51	.345	2.0→3.2	.88	.370	.2→1.4
Middle High	8	1.98	.104	1.9→2.1	2.90	.680	2.2→4.2	.93	.654	.3→2.3
High	1	2.50			2.50			.00		
Total	71	1.27	.495	.3→2.5	2.41	.541	.7→4.2	1.17	.514	.0→2.3
Lowrey										
Low	42	.78	.379	.1→1.3	2.04	.463	1.1→3.1	1.26	.430	.3→2.3
Middle Low	19	1.66	.126	1.5→1.8	2.54	.510	1.8→3.4	.87	.539	.0→1.7
Middle High	13	1.99	.104	1.9→2.1	2.78	.339	2.2→3.4	.79	.399	.1→1.5
High	9	2.54	.133	2.3→2.7	3.11	.372	2.6→3.6	.57	.427	.1→1.1
Total	83	1.36	.699	.1→2.7	2.38	.590	1.1→3.6	1.02	.513	.0→2.3
McDonald										
Low	31	.86	.278	.2→1.3	2.37	.658	1.5→4.1	1.51	.667	.4→2.9
Middle Low	11	1.61	.104	1.5→1.8	2.55	.573	1.5→3.3	.94	.530	.0→1.5
Middle High	5	1.98	.110	1.9→2.1	3.24	.635	2.5→4.2	1.26	.635	.6→2.3
High	8	2.58	.296	2.3→3.0	3.36	.374	2.8→3.8	.79	.275	.5→1.3
Total	55	1.36	.683	.2→3.0	2.62	.708	1.5→4.2	1.27	.655	.0→2.9
Woodworth										
Low	11	.90	.200	.6→1.3	2.53	.352	1.9→3.0	1.63	.429	1.0→2.4
Middle Low	9	1.63	.132	1.5→1.8	2.99	.528	2.0→3.4	1.36	.609	.2→1.9
Middle High	5	1.98	.110	1.9→2.1	2.80	.667	2.1→3.8	.82	.705	.0→1.9
High	4	2.68	.236	2.5→3.0	3.18	.403	2.7→3.6	.50	.408	.2→1.1
Total	29	1.56	.640	.6→3.0	2.81	.515	1.9→3.8	1.25	.658	.0→2.4
District										
Low	135	.88	.315	.1→1.3	2.25	.561	.7→4.1	1.38	.522	.2→2.9
Middle Low	61	1.63	.128	1.5→1.8	2.59	.488	1.5→3.4	.96	.507	.0→1.9
Middle High	31	1.98	.100	1.9→2.1	2.89	.542	2.1→4.2	.91	.558	.0→2.3
High	23	2.57	.219	2.3→3.0	3.15	.432	2.3→3.8	.58	.401	.0→1.3
Total	254	1.35	.625	.1→3.0	2.49	.613	.7→4.2	1.14	.578	.0→2.9

GRADE THREE STUDENT SUMMARY
WICAT ITBS STUDENT READING ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE TWO, LEVEL 7,MAY, 1987, PRETEST - ITBS, NORM=2.8
GRADE THREE, LEVEL 9, MAY, 1988, POSTTEST - ITBS, NORM=3.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest-----			-----Posttest-----			-------Gain--------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (93/ 85)*										
Low	27	1.49	.376	.6→2.0	2.47	.693	1.1→3.6	.99	.698	- .5→2.6
Middle Low	33	2.35	.194	2.1→2.7	3.07	.952	.4→5.8	.72	.907	-1.7→3.3
Middle High	10	3.04	.207	2.9→3.4	3.62	.579	2.6→4.7	.58	.543	- .3→1.3
High	5	4.34	.615	3.7→5.0	4.42	.654	3.7→5.3	.08	.986	-1.3→1.3
Total	75	2.26	.830	.6→5.0	3.02	.957	.4→5.8	.75	.819	-1.7→3.3
Lowrey (109/115)										
Low	25	1.60	.288	.9→2.0	2.30	.745	.9→3.5	.69	.769	-1.1→1.7
Middle Low	36	2.43	.196	2.1→2.7	3.26	.788	1.3→5.3	.83	.753	-1.0→2.9
Middle High	18	3.01	.168	2.9→3.4	3.90	.641	2.7→5.3	.89	.642	- .3→1.9
High	7	4.07	.482	3.7→5.0	4.84	.766	3.9→5.8	.77	.519	.0→1.5
Total	86	2.44	.745	.9→5.0	3.24	1.050	.9→5.8	.80	.713	-1.1→2.9
McDonald (58/ 55)										
Low	11	1.67	.304	.9→2.0	2.56	.612	1.6→3.4	.89	.691	- .1→2.0
Middle Low	25	2.48	.199	2.1→2.7	3.28	.696	1.6→4.8	.80	.647	-1.0→2.1
Middle High	9	3.11	.232	2.9→3.4	3.61	.894	2.2→5.5	.50	1.001	-1.2→2.6
High	4	4.05	.404	3.7→4.4	4.73	1.075	3.8→5.8	.68	1.118	- .6→1.8
Total	49	2.54	.696	.9→4.4	3.30	.915	1.6→5.8	.76	.756	-1.2→2.6
Woodworth (43/ 39)										
Low	13	1.59	.352	.7→2.0	2.58	.783	.9→3.9	.98	.576	.2→1.9
Middle Low	9	2.38	.097	2.2→2.5	3.56	.922	2.5→5.5	1.18	.920	.1→3.1
Middle High	3	3.03	.116	2.9→3.1	4.43	.924	3.9→5.5	1.40	1.039	.8→2.6
High	2	4.35	.919	3.7→5.0	4.25	1.485	3.2→5.3	- .10	.566	- .5→ .3
Total	27	2.22	.851	.7→5.0	3.23	1.092	.9→5.5	1.01	.795	- .5→3.1
District**										
Low	89	1.57	.346	.6→2.0	2.52	.718	.9→4.2	.95	.727	-1.1→3.0
Middle Low	116	2.40	.193	2.1→2.7	3.21	.821	.4→5.8	.81	.779	-1.7→3.3
Middle High	52	3.07	.200	2.9→3.4	3.88	.729	2.2→5.5	.81	.756	-1.2→2.6
High	42	4.43	.721	3.7→6.0	4.69	.889	2.9→6.5	.25	1.031	-2.4→2.1
Total	299	2.56	.985	.6→6.0	3.33	1.061	.4→6.5	.77	.826	-2.4→3.3

*The number of Salina students tested for pretest was 93 and posttest was 85. Analysis was made on 75 "same students" who were both pretested and posttested.

**Partial district includes some students who transferred to other Dearborn schools for the posttest.

GRADE THREE STUDENT SUMMARY
WICAT ITBS STUDENT MATHEMATICS ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE TWO, LEVEL 7, MAY, 1987, PRETEST - ITBS, NORM=2.8
GRADE THREE, LEVEL 9, MAY, 1988, POSTTEST - ITBS, NORM=3.8
GRADE EQUIVALENT SCORES

Total Mathematics

		-----Pretest-----			----Posttest-----			------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Low	31	1.91	.303	1.3→2.3	2.95	.820	1.0→4.7	1.04	.705	-.7→2.6
Middle Low	31	2.61	.150	2.4→2.8	3.69	.625	1.9→4.8	1.08	.605	-.8→2.2
Middle High	10	3.06	.190	2.9→3.4	3.81	.580	3.0→4.7	.75	.517	.1→1.5
High	3	3.57	.116	3.5→3.7	4.37	.513	3.8→4.8	.80	.625	.1→1.3
Total	75	2.42	.533	1.3→3.7	3.43	.811	1.0→4.8	1.00	.637	-.8→2.6
Lowrey										
Low	49	1.90	.265	1.2→2.3	2.88	.541	1.8→3.8	.98	.485	.0→2.1
Middle Low	20	2.57	.130	2.4→2.8	3.51	.958	1.9→5.0	.94	.945	-.8→2.3
Middle High	13	3.12	.217	2.9→3.4	3.85	.511	3.0→4.8	.73	.427	.1→1.4
High	4	3.70	.216	3.5→4.0	4.28	.378	3.8→4.7	.58	.411	.2→1.1
Total	84	2.33	.595	1.2→4.0	3.24	.780	1.8→5.0	.91	.611	-.8→2.3
McDonald										
Low	18	1.91	.317	1.1→2.3	2.99	.594	2.1→4.0	1.09	.621	.0→2.6
Middle Low	15	2.55	.119	2.4→2.8	3.61	.566	2.6→4.5	1.06	.560	.0→1.9
Middle High	11	3.13	.174	2.9→3.4	3.95	.491	3.0→4.6	.82	.523	.0→1.7
High	4	3.63	.189	3.5→3.9	4.20	.956	3.2→5.5	.58	.781	-.3→1.6
Total	48	2.53	.620	1.1→3.9	3.51	.716	2.1→5.5	.98	.597	-.3→2.6
Woodworth										
Low	14	1.89	.377	1.2→2.3	2.64	.595	1.8→4.0	.75	.668	-.1→2.1
Middle Low	5	2.56	.219	2.4→2.8	3.68	.581	2.7→4.1	1.12	.563	.3→1.6
Middle High	4	3.08	.150	2.9→3.2	3.88	.222	3.6→4.1	.80	.216	.6→1.1
High	3	3.57	.058	3.5→3.6	3.80	.361	3.5→4.2	.23	.416	-.1→ .7
Total	26	2.40	.686	1.2→3.6	3.18	.757	1.8→4.2	.77	.601	-.1→2.1
District										
Low	127	1.91	.290	1.1→2.3	2.89	.637	1.0→4.7	.98	.593	-.7→2.6
Middle Low	85	2.58	.144	2.4→2.8	3.59	.694	1.9→5.0	1.01	.679	-.8→2.3
Middle High	46	3.13	.189	2.9→3.4	3.89	.540	3.0→5.3	.76	.500	-.3→1.9
High	39	3.76	.250	3.5→4.4	4.41	.723	3.2→6.3	.64	.637	-.4→2.3
Total	297	2.53	.690	1.1→4.4	3.45	.841	1.0→6.3	.91	.623	-.8→2.6

GRADE FOUR STUDENT SUMMARY
WICAT ITBS STUDENT READING ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE THREE, LEVEL 9, MAY, 1987, PRETEST - ITBS, NORM=3.8
GRADE FOUR, LEVEL 10, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain--------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (97/ 84)*										
Low	42	2.22	.563	.7→2.9	3.42	.742	2.3→5.0	1.20	.823	- .3→3.6
Middle Low	28	3.34	.225	3.0→3.7	4.24	.688	2.7→5.8	.90	.617	- .5→2.1
Middle High	9	4.06	.265	3.8→4.5	4.73	.646	4.0→5.8	.68	.719	- .4→2.0
High	2	5.65	.212	5.5→5.8	6.75	.177	5.5→8.0	1.10	.156	.0→2.2
Total	81	2.90	.914	.7→5.8	3.93	.981	2.3→8.0	1.04	.771	- .5→3.6
Lowrey (86/102)										
Low	35	2.22	.610	.7→2.9	3.35	.939	1.7→5.4	1.13	.881	- .9→2.6
Middle Low	24	3.36	.239	3.0→3.7	4.08	.726	2.5→5.1	.71	.757	- .7→1.9
Middle High	16	4.16	.352	3.8→4.7	5.15	1.019	3.4→6.8	.99	.822	- .4→2.3
High	6	5.37	.625	4.8→6.5	5.67	.572	4.7→6.4	.30	.415	- .1→ .8
Total	81	3.17	1.088	.7→6.5	4.09	1.179	1.7→6.8	.92	.834	- .9→2.6
McDonald (67/ 60)										
Low	26	2.42	.507	1.1→2.9	3.78	.497	2.5→4.7	1.36	.601	.2→3.3
Middle Low	17	3.19	.192	3.0→3.6	4.27	.886	2.7→5.6	1.08	.825	- .4→2.4
Middle High	10	4.22	.301	3.9→4.7	5.45	.755	4.5→7.1	1.23	.842	.3→3.1
High	5	5.10	.566	4.8→6.1	6.20	1.477	4.4→8.0	1.10	1.241	- .4→3.0
Total	58	3.19	.968	1.1→6.1	4.42	1.110	2.5→8.0	1.23	.765	- .4→3.3
Woodworth (42/ 41)										
Low	12	2.54	.370	1.6→2.9	3.88	.921	2.5→5.4	1.33	1.003	- .1→3.8
Middle Low	8	3.16	.177	3.0→3.5	4.74	.563	4.0→5.5	1.58	.623	.7→2.5
Middle High	14	4.25	.259	3.9→4.7	5.70	.656	4.4→6.6	1.45	.705	.1→2.5
High	3	5.77	.643	5.3→6.5	6.67	1.021	5.5→7.4	.90	.889	.2→1.9
Total	37	3.58	1.033	1.6→6.5	4.98	1.180	2.5→7.4	1.39	.798	- .1→3.8
District (852/855)										
Low	234	2.29	.538	.7→2.9	3.53	.817	1.5→6.6	1.24	.845	-1.3→3.9
Middle Low	224	3.35	.227	3.0→3.7	4.37	.811	1.9→6.8	1.02	.764	-1.7→3.1
Middle High	198	4.20	.297	3.8→4.7	5.36	.885	3.2→8.3	1.16	.834	-1.1→3.9
High	100	5.55	.652	4.8→7.9	6.40	1.047	4.4→8.9	.85	.870	-1.2→3.0
Total	756	3.54	1.153	.7→7.9	4.64	1.301	1.5→8.9	1.10	.831	-1.7→3.9

*The number of Salina students tested for pretest was 97 and posttest was 84. Analysis was made on 81 "same" students who were both pretested and posttested.

GRADE FOUR STUDENT SUMMARY
WICAT ITBS STUDENT MATHEMATICS ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE THREE, LEVEL 9, MAY, 1987, PRETEST - ITBS, NORM=3.8
GRADE FOUR, LEVEL 10, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Total Mathematics

		-----Pretest-----			----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Low	33	2.51	.337	1.6→3.1	3.81	.593	2.8→5.1	1.29	.580	.1→2.7
Middle Low	25	3.47	.165	3.2→3.7	4.48	.519	3.2→5.4	1.01	.465	.0→2.0
Middle High	16	3.99	.148	3.8→4.3	4.96	.423	4.0→5.8	.96	.418	.0→1.6
High	6	5.18	.591	4.5→6.1	5.82	.975	4.4→6.9	.63	.638	- .4→1.5
Total	80	3.30	.846	1.6→6.1	4.40	.824	2.8→6.9	1.09	.546	- .4→2.7
Lowrey										
Low	38	2.67	.338	1.7→3.1	3.78	.529	2.6→4.7	1.10	.565	.0→2.7
Middle Low	23	3.42	.204	3.2→3.7	4.57	.599	3.3→5.9	1.16	.604	- .1→2.4
Middle High	17	4.02	.227	3.8→4.4	5.09	.594	3.9→5.7	1.07	.549	- .1→1.7
High	3	4.83	.404	4.6→5.3	5.87	.208	5.7→6.1	1.03	.208	.8→1.2
Total	81	3.25	.681	1.7→5.3	4.36	.820	2.6→6.1	1.11	.557	- .1→2.7
McDonald										
Low	29	2.76	.250	2.2→3.1	3.84	.542	3.0→5.1	1.08	.539	.1→2.1
Middle Low	10	3.49	.152	3.3→3.7	4.63	.302	4.2→5.5	1.14	.395	.6→1.6
Middle High	15	4.05	.177	3.8→4.3	5.26	.478	4.5→6.5	1.21	.427	.3→2.2
High	4	4.83	.206	4.6→5.1	6.08	.171	5.9→6.3	1.25	.300	.9→1.5
Total	58	3.36	.715	2.2→5.1	4.50	.877	3.0→6.5	1.14	.469	.1→2.2
Woodworth										
Low	13	2.85	.247	2.5→3.1	3.94	.613	2.6→5.0	1.09	.507	.0→1.9
Middle Low	10	3.32	.103	3.2→3.5	4.70	.516	3.8→5.6	1.38	.507	.5→2.2
Middle High	10	4.14	.207	3.8→4.4	5.04	.207	4.7→5.4	.90	.279	.5→1.2
High	4	4.85	.342	4.5→5.3	6.05	.646	5.1→6.5	1.20	.726	.2→1.9
Total	37	3.54	.722	2.5→5.3	4.67	.825	2.6→6.5	1.13	.497	.0→2.2
District										
Low	235	2.67	.320	1.6→3.1	3.82	.602	2.6→5.5	1.15	.589	- .1→2.9
Middle Low	184	3.47	.176	3.2→3.7	4.53	.563	2.9→5.9	1.06	.540	- .8→2.5
Middle High	202	4.07	.195	3.8→4.4	5.08	.567	3.3→6.5	1.01	.513	- .5→2.5
High	134	4.98	.437	4.5→6.7	5.87	.650	3.7→7.7	.89	.675	-1.0→3.1
Total	755	3.65	.868	1.6→6.7	4.69	.934	2.6→7.7	1.05	.581	-1.0→3.1

THREE-YEAR GRADE FOUR STUDENT SUMMARY
WICAT METRO/ITBS STUDENT ACHIEVEMENT ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE ONE, MAY, 1985, PRETEST - METRO, NORM=1.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest-----			-----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (113/ 84)*	72	1.6	.450	1.0→4.3	4.0	.993	2.3→8.0	2.3	.785	.9→4.2
Lowrey (95/102)	61	1.8	.620	.5→4.3	4.1	1.093	1.9→6.4	2.3	.938	.3→4.4
McDonald (74/ 60)	53	2.0	.691	1.1→5.9	4.4	1.132	2.5→8.0	2.4	1.026	.1→5.5
Woodworth (37/ 41)	28	2.4	1.009	1.4→5.9	5.1	1.202	2.5→7.4	2.7	.982	.6→4.1
District (854/855)	608	2.1	.876	.5→5.9	4.7	1.304	1.5→8.9	2.5	1.052	-.2→6.0

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina	72	1.8	.629	.1→3.4	4.5	.806	3.1→6.9	2.7	.629	1.4→4.3
Lowrey	61	2.3	.757	1.1→5.7	4.4	.819	2.9→6.1	2.1	.777	.0→3.6
McDonald	53	2.2	.680	.9→4.5	4.5	.879	3.0→6.5	2.3	.760	.9→4.3
Woodworth	28	2.4	.696	.9→4.1	4.8	.780	3.2→6.5	2.5	.617	1.4→3.8
District	608	2.3	.805	.1→5.7	4.7	.927	2.6→7.7	2.4	.753	.0→4.8

*The number of Salina students tested for pretest was 113 and posttest was 84. Analysis was made on 72 "same" students who were both pretested and posttested.

THREE-YEAR GRADE FOUR STUDENT SUMMARY
WICAT METRO/ITBS STUDENT READING ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE ONE, MAY, 1985, PRETEST - METRO, NORM=1.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina (113/ 84)										
Low	23	1.27	.111	1.0→1.4	3.47	.864	2.3→5.0	2.20	.814	1.0→3.6
Middle Low	34	1.58	.072	1.5→1.7	3.93	.780	2.5→5.8	2.34	.783	.9→4.2
Middle High	10	1.97	.142	1.8→2.2	4.48	.559	3.6→5.2	2.51	.606	1.4→3.2
High	5	2.78	.856	2.3→4.3	5.46	1.670	3.4→8.0	2.68	1.031	1.1→3.7
Total	72	1.62	.450	1.0→4.3	3.96	.993	2.3→8.0	2.34	.785	.9→4.2
Lowrey (95/102)										
Low	16	1.24	.231	.5→1.4	3.63	.931	2.3→5.1	2.39	1.011	1.0→4.0
Middle Low	21	1.60	.078	1.5→1.7	3.56	.715	1.9→4.7	1.96	.729	.3→3.1
Middle High	18	1.97	.141	1.8→2.2	4.58	1.074	2.5→6.4	2.61	1.110	.3→4.4
High	6	3.28	.680	2.4→4.3	5.60	.548	4.7→6.4	2.32	.549	1.3→2.8
Total	61	1.78	.620	.5→4.3	4.08	1.093	1.9→6.4	2.30	.938	.3→4.4
McDonald (74/ 60)										
Low	7	1.30	.129	1.1→1.4	3.89	.649	3.2→4.9	2.59	.628	1.8→3.5
Middle Low	11	1.61	.054	1.5→1.7	4.51	1.103	2.9→7.1	2.90	1.112	1.3→5.5
Middle High	25	2.01	.132	1.8→2.2	4.16	.804	2.7→5.8	2.15	.781	.8→3.6
High	10	2.91	1.099	2.3→5.9	5.28	1.673	2.5→8.0	2.37	1.521	.1→5.5
Total	53	2.00	.691	1.1→5.9	4.41	1.132	2.5→8.0	2.41	1.026	.1→5.5
Woodworth (37/ 41)										
Low	1	1.40			5.10			3.70		
Middle Low	6	1.63	.082	1.5→1.7	4.45	1.088	2.5→5.5	2.82	1.069	.9→3.9
Middle High	11	1.99	.138	1.8→2.2	4.46	.969	2.5→6.0	2.47	.957	.6→4.1
High	10	3.32	1.176	2.3→5.9	6.22	.681	5.4→7.4	2.90	1.009	1.2→4.1
Total	28	2.37	1.009	1.4→5.9	5.11	1.202	2.5→7.4	2.74	.982	.6→4.1
District (854/855)										
Low	78	1.28	.161	.5→1.4	3.73	.952	1.5→5.8	2.45	.964	.1→4.5
Middle Low	153	1.61	.073	1.5→1.7	3.97	.946	1.9→7.1	2.36	.946	.3→5.5
Middle High	156	1.95	.103	1.8→2.1	4.50	1.073	1.9→8.0	2.55	1.061	-.2→6.0
High	221	2.95	.976	2.2→5.9	5.56	1.217	2.5→8.9	2.61	1.134	-.2→5.8
Total	608	2.14	.876	.5→5.9	4.65	1.304	1.5→8.9	2.51	1.052	-.2→6.0

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THREE-YEAR GRADE FOUR STUDENS SUMMARY
WICAT METRO/ITBS STUDENT MATHEMATICS ACHIEVEMENT LEVEL ANALYSIS
SALINA ELEMENTARY SCHOOL (WICAT)
LOWREY ELEMENTARY SCHOOL (NON-WICAT)
MCDONALD ELEMENTARY SCHOOL (NON-WICAT)
WOODWORTH ELEMENTARY SCHOOL (NON-WICAT)
GRADE ONE, MAY, 1985, PRETEST - METRO, NORM=1.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Total Mathematics

		-----Pretest-----			----Posttest-----			------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Low	17	1.01	.442	.1→1.4	3.98	.629	3.1→5.1	2.97	.602	1.9→4.2
Middle Low	33	1.76	.180	1.5→2.0	4.30	.657	3.2→5.8	2.53	.621	1.4→3.9
Middle High	14	2.24	.128	2.1→2.5	4.78	.468	3.6→5.3	2.54	.438	1.5→3.1
High	7	2.91	.398	2.6→3.4	5.69	.979	4.3→6.9	2.77	.875	1.7→4.3
Total	71	1.78	.629	.1→3.4	4.45	.806	3.1→6.9	2.66	.629	1.4→4.3
Lowrey										
Low	7	1.28	.135	1.1→1.4	3.90	.563	3.1→4.7	2.61	.684	1.7→3.6
Middle Low	19	1.80	.145	1.5→2.0	3.96	.551	3.1→4.9	2.16	.547	1.3→3.3
Middle High	19	2.33	.129	2.1→2.5	4.46	.762	3.1→5.7	2.13	.781	.7→3.6
High	16	3.14	.831	2.6→5.7	5.02	.853	2.9→6.1	1.88	.978	.0→3.2
Total	61	2.26	.757	1.1→5.7	4.39	.819	2.9→6.1	2.13	.777	.0→3.6
McDonald										
Low	4	1.13	.263	.9→1.4	3.90	.668	3.3→4.8	2.78	.900	2.0→3.9
Middle Low	17	1.74	.187	1.5→2.0	4.18	.834	3.0→5.9	2.45	.842	1.1→4.3
Middle High	20	2.29	.135	2.1→2.5	4.58	.860	3.1→6.5	2.29	.826	.9→4.0
High	12	3.15	.579	2.6→4.5	5.21	.617	4.2→6.3	2.06	.353	1.6→2.6
Total	53	2.22	.680	.9→4.5	4.54	.876	3.0→6.5	2.32	.760	.9→4.3
Woodworth										
Low	2	1.15	.354	.9→1.4	4.50	.849	3.9→5.1	3.35	.495	3.0→3.7
Middle Low	7	1.80	.200	1.6→2.0	4.11	.587	3.2→5.0	2.31	.587	1.6→3.4
Middle High	11	2.31	.130	2.1→2.5	4.78	.449	3.8→5.4	2.47	.415	1.6→2.9
High	8	3.19	.522	2.6→4.1	5.51	.764	4.7→6.5	2.33	.789	1.4→3.8
Total	28	2.35	.696	.9→4.1	4.80	.780	3.2→6.5	2.45	.617	1.4→3.8
District										
Low	36	.89	.376	.1→1.3	3.99	.702	2.6→5.9	3.10	.678	1.8→4.8
Middle Low	117	1.62	.136	1.4→1.8	4.10	.655	2.9→5.9	2.48	.622	1.2→4.3
Middle High	224	2.15	.171	1.9→2.4	4.54	.735	2.8→6.4	2.38	.731	.7→4.1
High	231	3.11	.659	2.5→5.7	5.35	.863	2.9→7.7	2.24	.765	.0→4.3
Total	608	2.34	.805	.1→5.7	4.73	.927	2.6→7.7	2.39	.753	.0→4.8

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GRADE THREE STUDENT ACHIEVEMENT BY GENDER
ITBS STUDENT ACHIEVEMENT BY SCHOOL
GRADE TWO, LEVEL 7, MAY, 1987, PRETEST - ITBS, NORM=2.8
GRADE THREE, LEVEL 9, MAY, 1988, POSTTEST - ITBS, NORM=3.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Boys	43	2.27	.762	.8→5.0	3.09	.875	1.3→5.8	.82	.845	-1.3→3.3
Girls	32	2.25	.926	.6→5.0	2.92	1.064	.4→5.3	.66	.786	-1.7→1.8
Lowrey										
Boys	45	2.28	.685	.9→4.0	3.12	1.047	.9→5.5	.85	.847	-1.1→3.0
Girls	49	2.52	.814	.8→5.0	3.34	1.012	1.1→5.8	.82	.619	- .6→1.9
McDonald										
Boys	31	2.44	.593	.9→3.7	3.27	.852	1.6→5.5	.83	.766	-1.0→2.6
Girls	20	2.73	.836	1.4→4.4	3.28	1.006	1.8→5.8	.55	.772	-1.2→1.8
Woodworth										
Boys	15	2.19	.652	.7→3.1	3.33	1.237	.9→5.5	1.13	.815	.2→3.1
Girls	14	2.26	.998	1.3→5.0	3.15	.867	1.8→5.3	.89	.725	- .5→1.9
District										
Boys	160	2.50	.932	.7→6.0	3.31	1.038	.9→5.8	.81	.870	-2.4→3.3
Girls	139	2.62	1.043	.6→5.0	3.35	1.090	.4→6.5	.73	.773	-1.9→2.6

Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Boys	43	2.48	.514	1.3→3.7	3.63	.659	2.1→4.8	1.15	.571	.1→2.6
Girls	32	2.34	.556	1.4→3.5	3.16	.923	1.0→4.8	.82	.680	- .8→2.2
Lowrey										
Boys	45	2.32	.569	1.6→4.0	3.23	.729	2.0→5.0	.91	.907	- .7→2.3
Girls	49	2.30	.604	1.2→3.6	3.20	.808	1.8→4.8	.90	.607	- .8→2.1
McDonald										
Boys	31	2.52	.634	1.1→3.6	3.43	.666	2.1→4.6	.91	.534	- .3→1.8
Girls	19	2.49	.593	1.4→3.9	3.59	.771	2.2→5.5	1.09	.660	.0→2.6
Woodworth										
Boys	15	2.54	.666	1.2→3.6	3.28	.656	1.8→4.1	.74	.619	- .1→2.1
Girls	13	2.22	.638	1.4→3.5	3.03	.820	1.8→4.2	.76	.565	- .1→1.6
District										
Boys	160	2.60	.682	1.1→4.4	3.52	.767	1.8→5.7	.92	.613	- .7→2.6
Girls	137	2.46	.695	1.2→4.1	3.36	.913	1.0→6.3	.90	.636	- .8→2.6

GRADE THREE STUDENT ACHIEVEMENT LEVEL BY GENDER
ITBS STUDENT ACHIEVEMENT
PARTIAL DISTRICT
GRADE THREE STUDENTS
GRADE TWO, LEVEL 7, MAY, 1987, PRETEST - ITBS, NORM=2.8
GRADE THREE, LEVEL 9, MAY, 1988, POSTTEST - ITBS, NORM=3.8
GRADE EQUIVALENT SCORES

Reading Coprehension

		-----Pretest------			-----Posttest-----			-------Gain--------		
Partial District	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Boys										
Low	47	1.60	.372	.7→2.0	2.50	.753	.9→4.2	.91	.720	-1.1→3.0
Middle Low	68	2.41	.194	2.1→2.7	3.32	.879	1.3→5.8	.90	.849	-1.1→3.3
Middle High	30	3.06	.194	2.9→3.4	3.89	.729	2.6→5.5	.83	.751	- .3→2.6
High	15	4.61	.959	3.7→6.0	4.62	.919	2.9→5.8	.01	1.232	-2.4→2.1
Total	160	2.50	.932	.7→6.0	3.31	1.038	.9→5.8	.81	.870	-2.4→3.3
Girls										
Low	42	1.54	.316	.6→2.0	2.54	.685	1.1→3.9	1.00	.740	- .6→2.4
Middle Low	48	2.39	.193	2.1→2.7	3.06	.711	.4→4.4	.67	.652	-1.7→1.8
Middle High	22	3.09	.211	2.9→3.4	3.87	.745	2.2→5.5	.78	.780	-1.2→2.6
High	27	4.33	.544	3.7→5.0	4.73	.888	3.1→6.5	.39	.897	-1.9→1.8
Total	139	2.62	1.043	.6→5.0	3.35	1.090	.4→6.5	.73	.773	-1.9→2.6

Total Mathematics

Partial District	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Boys										
Low	60	1.93	.288	1.1→2.3	3.00	.593	1.8→4.7	1.07	.543	.0→2.6
Middle Low	50	2.60	.148	2.4→2.8	3.63	.655	2.0→5.0	1.03	.617	- .7→2.3
Middle High	26	3.07	.178	2.9→3.4	3.81	.587	3.0→5.3	.74	.576	- .3→1.9
High	24	3.76	.275	3.5→4.4	4.26	.685	3.2→5.7	.50	.599	- .4→1.9
Total	160	2.60	.682	1.1→4.4	3.52	.767	1.8→5.7	.92	.613	- .7→2.6
Girls										
Low	67	1.90	.293	1.2→2.3	2.79	.662	1.0→4.5	.90	.626	- .7→2.6
Middle Low	35	2.54	.134	2.4→3.8	3.52	.750	1.9→4.7	.97	.766	- .8→2.1
Middle High	20	3.20	.181	2.9→3.4	4.00	.466	3.0→4.8	.80	.393	.1→1.4
High	15	3.77	.213	3.5→4.1	4.63	.747	3.6→6.3	.87	.651	.1→2.3
Total	137	2.46	.695	1.2→4.1	3.36	.913	1.0→6.3	.90	.636	- .8→2.6

GRADE FOUR STUDENT ACHIEVEMENT BY GENDER
ITBS STUDENT ACHIEVEMENT BY SCHOOL
GRADE THREE, LEVEL 9, MAY, 1987, PRETEST - ITBS, NORM=3.8
GRADE FOUR, LEVEL 10, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Boys	44	2.77	.886	.7→4.5	3.77	.922	2.3→5.8	1.01	.726	- .5→2.7
Girls	37	3.05	.935	1.3→5.8	4.12	1.026	2.3→8.0	1.07	.829	- .4→3.6
Lowrey										
Boys	55	3.04	1.190	.7→6.5	3.85	1.141	1.7→6.4	.80	.776	- .9→2.3
Girls	31	3.32	.787	1.6→4.8	4.39	1.139	1.9→6.8	1.08	.885	- .6→2.6
McDonald										
Boys	36	3.18	1.017	1.1→5.0	4.50	1.141	2.5→8.0	1.32	.836	- .4→3.3
Girls	23	3.19	.885	2.0→6.1	4.27	1.046	2.7→7.4	1.07	.610	- .4→2.4
Woodworth										
Boys	19	3.59	1.016	1.6→5.5	4.98	1.136	2.5→7.4	1.39	.891	.1→3.8
Girls	18	3.57	1.079	2.2→6.5	4.97	1.258	2.5→7.1	1.40	.712	- .1→2.5
District										
Boys	394	3.42	1.168	.7→7.0	4.49	1.257	1.5→8.3	1.07	.874	-1.7→3.9
Girls	362	3.66	1.125	1.1→7.9	4.79	1.332	1.9→8.9	1.14	.781	-1.1→3.6

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Boys	44	3.11	.770	1.6→5.4	4.28	.797	2.8→6.9	1.15	.592	.0→2.7
Girls	37	3.52	.887	2.2→6.1	4.54	.844	3.1→6.9	1.02	.486	- .4→2.0
Lowrey										
Boys	55	3.21	.698	1.7→5.3	4.35	.809	2.6→6.1	1.14	.599	- .1→2.7
Girls	31	3.27	.639	2.1→4.6	4.33	.856	3.1→5.8	1.06	.591	- .1→2.3
McDonald										
Boys	36	3.43	.722	2.4→4.8	4.64	.885	3.0→6.5	1.21	.461	.1→2.2
Girls	23	3.21	.703	2.2→5.1	4.24	.815	3.1→6.0	1.03	.462	.2→2.0
Woodworth										
Boys	19	3.66	.674	2.6→5.3	4.84	.827	3.2→6.5	1.18	.508	.5→2.2
Girls	18	3.42	.770	2.5→4.9	4.49	.806	2.6→6.2	1.07	.492	.0→1.8
District										
Boys	393	3.58	.845	1.6→6.7	4.66	.928	2.6→7.7	1.07	.616	-1.0→3.1
Girls	362	3.72	.887	1.6→6.4	4.74	.940	2.6→7.3	1.02	.540	- .8→2.5

GRADE FOUR STUDENT ACHIEVEMENT LEVEL BY GENDER
ITBS STUDENT ACHIEVEMENT
DISTRICT
GRADE THREE, APRIL, 1987, PRETEST - ITBS, NORM=3.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Coprehension

		-----Pretest------			-----Posttest-----			-------Gain-------		
District	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Boys										
Low	142	2.24	.547	.7→2.9	3.51	.830	1.5→6.6	1.27	.859	-1.3→3.9
Middle Low	103	3.33	.218	3.0→3.7	4.30	.862	1.9→6.2	.97	.826	-1.7→2.8
Middle High	101	4.20	.293	3.8→4.7	5.31	.890	3.2→8.3	1.11	.852	-1.1→3.9
High	48	5.48	.609	4.8→7.0	6.10	.912	4.4→8.0	.62	.895	-1.2→3.0
Total	394	3.42	1.168	.7→7.0	4.49	1.257	1.5→8.3	1.07	.874	-1.7→3.9
Girls										
Low	92	2.36	.518	1.1→2.9	3.56	.799	1.9→5.4	1.20	.825	- .6→3.6
Middle Low	121	3.36	.234	3.0→3.7	4.23	.763	1.9→6.8	1.07	.708	-1.1→3.1
Middle High	97	4.20	.302	3.8→4.7	5.41	.881	3.6→8.0	1.21	.815	-1.1→3.3
High	52	5.62	.688	4.8→7.9	6.68	1.094	4.5→8.9	1.06	.798	- .5→2.7
Total	362	3.66	1.125	1.1→7.9	4.79	1.332	1.9→8.9	1.14	.781	-1.1→3.6

Total Mathematics

District	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Boys										
Low	126	2.63	.331	1.6→3.1	3.85	.630	2.6→5.5	1.21	.637	- .1→2.9
Middle Low	100	3.47	.172	3.2→3.7	4.53	.590	2.9→5.9	1.06	.554	- .8→2.4
Middle High	106	4.05	.204	3.8→4.4	5.06	.636	3.3→6.5	1.01	.579	- .5→2.5
High	61	4.92	.414	4.5→6.7	5.82	.689	3.7→7.7	.90	.680	-1.0→3.1
Total	393	3.58	.845	1.6→6.7	4.66	.928	2.6→7.7	1.07	.616	-1.0→3.1
Girls										
Low	109	2.71	.303	1.6→3.1	3.80	.571	2.6→5.3	1.09	.525	.0→2.4
Middle Low	84	3.47	.182	3.2→3.7	4.53	.532	3.1→5.8	1.06	.526	- .1→2.5
Middle High	96	4.08	.183	3.8→4.4	5.09	.482	3.8→6.4	1.01	.432	- .2→2.0
High	73	5.03	.453	4.5→6.4	5.90	.617	4.4→7.3	.87	.675	- .8→2.5
Total	362	3.72	.887	1.6→6.4	4.74	.940	2.6→7.3	1.02	.540	- .8→2.5

THREE-YEAR GRADE FOUR STUDENT ACHIEVEMENT BY GENDER
METRO/ITBS STUDENT ACHIEVEMENT BY SCHOOL
GRADE ONE, MAY, 1987, PRETEST - METRO, NORM=1.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain-------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Boys	41	1.56	.329	1.0→2.5	3.83	.919	2.3→5.8	2.27	.845	.9→4.2
Girls	32	1.71	.565	1.2→4.3	4.17	1.072	2.3→8.0	2.46	.697	1.0→3.9
Lowrey										
Boys	48	1.75	.460	1.0→3.6	3.99	1.147	1.9→6.4	2.23	1.003	.3→4.5
Girls	26	1.83	.756	.5→4.3	4.27	.931	2.3→5.8	2.44	.887	1.0→4.0
McDonald										
Boys	32	1.99	.463	1.1→3.3	4.54	1.171	2.5→8.0	2.54	1.139	.1→5.5
Girls	21	2.01	.953	1.2→5.9	4.21	1.066	2.7→7.4	2.20	.805	.8→3.5
Woodworth										
Boys	17	2.12	.497	1.4→3.3	4.94	1.195	2.5→7.4	2.82	1.028	.6→4.1
Girls	14	2.59	1.328	1.3→5.9	5.19	1.141	2.5→7.1	2.61	.851	.9→3.7
District										
Boys	314	2.02	.750	.6→5.9	4.53	1.284	1.5→8.3	2.51	1.067	.1→5.8
Girls	294	2.27	.977	.5→5.9	4.78	1.316	1.9→8.9	2.51	1.037	-.2→6.0

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Salina										
Boys	41	1.65	.540	.1→2.6	4.34	.779	3.2→6.9	2.67	.712	1.4→4.3
Girls	32	1.98	.729	.2→3.4	4.61	.823	3.1→6.9	2.63	.523	1.7→3.9
Lowrey										
Boys	48	2.30	.749	1.3→5.7	4.40	.792	2.9→6.1	2.10	.765	.0→3.6
Girls	26	2.06	.601	1.1T4.1	4.28	.787	3.1→5.7	2.22	.733	1.2→3.6
McDonald										
Boys	32	2.30	.754	.9→4.5	4.77	.854	3.0→6.5	2.47	.789	1.1→4.3
Girls	21	2.09	.540	1.3→3.7	4.20	.811	3.1→6.0	2.11	.677	.9→3.6
Woodworth										
Boys	17	2.48	.714	1.4→4.1	4.94	.818	3.2→6.5	2.46	.747	1.4→3.8
Girls	14	2.26	.650	.9→3.7	4.69	.646	3.9→6.2	2.43	.429	1.8→3.2
District										
Boys	314	2.33	.824	.1→5.7	4.70	.920	2.8→7.7	2.37	.796	.0→4.8
Girls	294	2.35	.784	.2→5.7	4.76	.935	2.6→7.3	2.41	.706	.3→4.3

THREE-YEAR GRADE FOUR STUDENT ACHIEVEMENT LEVEL BY GENDER
METRO/ITBS STUDENT ACHIEVEMENT
DISTRICT
GRADE FOUR STUDENTS
GRADE ONE, MAY, 1985, PRETEST - METRO, NORM=1.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Coprehension

		-----Pretest------			-----Posttest-----			-------Gain---------		
District	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Boys										
Low	49	1.28	.153	.6→1.4	3.62	.957	1.5→5.8	2.34	.950	.1→4.5
Middle Low	85	1.62	.073	1.5→1.7	3.98	.993	1.9→7.1	2.37	.985	.3→5.5
Middle High	78	1.95	.099	1.8→2.1	4.48	1.055	2.4→7.1	2.53	1.039	.3→5.1
High	102	2.77	.865	2.2→5.9	5.47	1.212	2.5→8.3	2.70	1.184	.1→5.8
Total	314	2.02	.750	.6→5.9	4.53	1.284	1.5→8.3	2.51	1.067	.1→5.8
Girls										
Low	29	1.27	.176	.5→1.4	3.91	.932	2.3→5.4	2.64	.974	1.0→4.1
Middle Low	68	1.61	.072	1.5→1.7	3.95	.891	2.1→7.1	2.34	.900	.4→5.5
Middle High	78	1.95	.108	1.8→2.1	4.52	1.097	1.9→8.0	2.57	1.089	- .2→6.0
High	119	3.11	1.040	2.2→5.9	5.63	1.221	2.5→8.9	2.53	1.089	- .2→5.7
Total	294	2.27	.977	.5→5.9	4.78	1.316	1.9→8.9	2.51	1.037	- .2→6.0

Total Mathematics

District	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Boys										
Low	19	.92	.358	.1→1.3	4.12	.750	2.8→5.9	3.21	.760	2.1→4.8
Middle Low	66	1.62	.145	1.4→1.8	4.14	.673	2.9→5.9	2.52	.687	1.4→4.3
Middle High	111	2.16	.172	1.9→2.4	4.51	.750	2.9→6.4	2.35	.757	.7→4.1
High	118	3.12	.706	2.5→5.7	5.29	.878	2.9→7.7	2.18	.804	.0→4.3
Total	314	2.33	.824	.1→5.7	4.70	.920	2.8→7.7	2.37	.796	.0→4.8
Girls										
Low	17	.85	.402	.2→1.3	3.84	.637	2.6→4.8	2.99	.579	1.8→3.9
Middle Low	51	1.63	.124	1.4→1.8	4.06	.635	3.0→5.2	2.43	.632	1.2→3.6
Middle High	113	2.14	.170	1.9→2.4	4.56	.722	2.8→6.2	2.42	.705	.7→3.9
High	113	3.10	.607	2.5→5.7	5.40	.848	2.9→7.3	2.31	.720	.3→4.3
Total	294	2.35	.784	.2→5.7	4.76	.935	2.6→7.3	2.41	.706	.3→4.3

GRADE THREE STUDENT SUMMARY
ITBS STUDENT ACHIEVEMENT ANALYSIS
PARTIAL DISTRICT BY SCHOOL
GRADE TWO, LEVEL 7, MAY, 1987, PRETEST - ITBS, NORM=2.8
GRADE THREE, MAY, 1988, POSTTEST - ITBS, NORM=3.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain--------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Lowrey	94	2.41	.756	.8→5.0	3.24	1.029	.9→5.8	.83	.733	-1.1→3.0
McDonald	51	2.55	.705	.9→4.4	3.27	.905	1.6→5.8	.72	.773	-1.2→2.6
Salina	75	2.26	.830	.6→5.0	3.02	.957	.4→5.8	.75	.819	-1.7→3.3
Snow	41	3.62	1.289	1.0→6.0	4.11	.961	2.3→5.8	.49	1.060	-2.4→2.6
Woodworth	29	2.22	.822	.7→5.0	3.24	1.060	.9→5.5	1.02	.769	- .5→3.3
Total	299*	2.56	.985	.6→6.0	3.33	1.061	.4→6.5	.77	.826	-2.4→3 3

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Lowrey	94	2.31	.584	1.2→4.0	3.22	.768	1.8→5.0	.90	.603	- .8→2.3
McDonald	50	2.51	.613	1.1→3.9	3.49	.706	2.1→5.5	.98	.585	- .3→2.6
Salina	75	2.42	.533	1.3→3.7	3.43	.811	1.0→4.8	1.01	.637	- .8→2.6
Snow	41	3.40	.640	1.7→4.4	4.10	.851	1.6→5.7	.70	.642	- .4→1.9
Woodworth	28	2.39	.661	1.2→3.6	3.16	.738	1.8→4.2	.75	.583	.1→2.1
Total	297*	2.53	.690	1.1→4.4	3.45	.841	1.0→6.3	.91	.623	- .8→2.6

*Includes some students who transferred to other district schools for the post-test.

Note: A choice of functional level 7 or level 8 grade two testing was made for each school which resulted in partial district results.

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GRADE THREE STUDENT SUMMARY
ITBS STUDENT ACHIEVEMENT ANALYSIS
PARTIAL DISTRICT BY SCHOOL
GRADE TWO, LEVEL 8, MAY, 1987, PRETEST - ITBS, NORM=2.8
GRADE THREE, MAY, 1988, POSTTEST - ITBS, NORM=3.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain--------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
DuVall	21	2.67	.941	1.2→4.1	3.81	.987	2.3→6.1	1.15	.696	.2→2.5
Henry Ford	38	2.81	1.139	1.2→6.1	3.78	1.190	1.5→7.0	.97	.747	- .8→2.9
Wm. Ford	39	2.80	1.074	1.2→5.3	3.27	.993	.9→5.3	.47	.530	- .6→1.7
Haigh	39	3.61	1.137	1.5→6.1	4.36	1.097	2.0→6.1	.80	1.008	-1.3→3.3
Howard	28	3.31	1.147	1.2→5.6	4.17	1.294	1.6→7.0	.86	.774	- .2→2.3
Lindbergh	33	3.63	1.202	1.5→6.7	4.35	1.179	2.6→7.0	.72	1.092	-1.2→3.4
Long	40	2.84	1.004	.6→5.6	3.71	1.002	1.6→6.1	.84	.951	-1.4→2.9
Maples	46	2.74	1.160	.7→6.1	3.55	1.232	.9→7.9	.80	.750	-1.2→2.7
Nowlin	29	3.27	.975	2.1→6.1	3.59	1.038	2.0→5.5	.32	1.000	-3.4→2.0
Oakman	38	2.25	.922	1.2→5.3	2.81	.914	1.3→5.5	.56	.662	-1.8→1.7
River Oaks	39	3.04	1.304	.8→6.1	3.74	1.187	2.0→6.5	.70	.686	- .9→2.4
Whitmore-Bolles	59	3.17	1.127	1.3→6.1	3.79	1.014	2.0→6.1	.59	.883	-2.0→2.5
Total	455*	3.00	1.156	.6→6.7	3.73	1.157	.9→7.9	.72	.841	-3.4→3.4

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
DuVall	21	3.33	.788	1.9→5.1	3.76	.786	2.1→4.9	.43	.478	- .5→1.4
Henry Ford	38	3.27	.740	1.9→4.9	3.86	.954	2.4→6.0	.59	.609	- .4→2.5
Wm. Ford	39	2.93	.749	1.7→4.9	3.45	.754	2.2→5.0	.52	.523	- .9→1.4
Haigh	40	3.35	.695	1.7→5.2	4.09	.990	1.5→5.7	.75	.858	-1.4→1.9
Howard	28	3.04	.733	1.7→4.2	4.20	.835	2.6→5.4	1.15	.481	.2→2.4
Lindbergh	33	3.23	.665	2.1→5.0	3.88	.837	2.2→5.7	.65	.456	- .2→1.6
Long	40	3.23	.742	1.5→4.9	3.89	.803	1.9→6.3	.66	.494	- .6→1.6
Maples	46	3.05	.728	1.9→4.7	3.70	.942	2.2→5.9	.65	.513	- .4→1.6
Nowlin	29	3.08	.665	1.9→4.9	3.91	.800	2.1→5.6	.83	.716	- .8→2.8
Oakman	38	2.66	.612	1.8→4.1	3.23	.792	2.1→5.1	.56	.497	- .5→1.4
River Oaks	39	3.02	.756	1.9→4.9	3.82	.926	1.9→5.9	.81	.582	- .6→2.6
Whitmore-Bolles	60	3.28	.723	1.9→4.8	3.71	.821	2.1→5.5	.44	.788	-1.8→2.0
Total	457*	3.12	.732	1.5→5.2	3.77	.882	1.5→6.3	.65	.629	-1.8→2.8

*Includes some students who transferred to other district schools for the post-test.

Note: A choice of functional level 7 or level 8 grade two testing was made for each school which resulted in partial district results.

GRADE FOUR STUDENT SUMMARY
ITBS STUDENT ACHIEVEMENT ANALYSIS
DISTRICT BY SCHOOL
GRADE THREE, APRIL, 1987, PRETEST - ITBS, NORM=3.8
GRADE FOUR, MAY, 1988, POSTTEST - ITBS, NORM=4.8
GRADE EQUIVALENT SCORES

Reading Comprehension

		-----Pretest------			-----Posttest-----			-------Gain--------		
School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
DuVall	25	4.05	1.095	1.6→5.8	5.07	1.098	2.9→7.1	1.02	.647	- .2→2.3
Henry Ford	36	3.58	.961	1.5→6.1	4.46	1.213	1.9→7.7	.90	.765	-1.1→2.5
Wm. Ford	33	3.42	1.025	1.1→6.1	4.28	.998	2.4→6.6	.86	.739	- .7→2.4
Haigh	42	4.25	1.325	2.0→7.0	5.31	1.386	3.1→8.0	1.06	.820	- .5→3.0
Howard	36	4.22	.928	1.8→6.5	5.74	1.222	3.4→8.6	1.53	.664	.5→3.3
Lindbergh	33	3.98	1.116	2.2→7.9	5.15	1.249	2.5→8.0	1.17	.859	- .1→3.1
Long	35	3.80	1.314	1.5→7.0	4.92	1.336	2.5→7.7	1.12	.975	-1.1→3.0
Lowrey	86	3.14	1.066	.7→6.5	4.05	1.163	1.7→6.8	.90	.823	- .9→2.6
Maples	41	3.45	.968	1.3→5.8	4.62	1.214	2.3→7.7	1.17	.790	- .6→2.7
McDonald	59	3.18	.960	1.1→6.1	4.41	1.102	2.5→8.0	1.23	.760	- .4→3.3
Nowlin	26	3.34	1.086	1.1→5.3	4.01	1.159	1.5→5.6	.67	1.116	-1.7→2.5
Oakman	41	3.13	1.153	1.1→5.5	4.34	1.226	2.1→7.1	1.20	.567	.2→2.6
River Oaks	33	3.98	1.350	1.1→7.9	5.20	1.539	2.5→8.9	1.23	.762	- .7→3.0
Salina	81	2.90	.914	.7→5.8	3.93	.981	2.3→8.0	1.04	.771	- .5→3.6
Snow	41	3.89	1.045	1.8→6.1	5.14	1.472	2.4→8.3	1.25	.960	- .7→3.9
Whitmore-Bolles	71	3.69	1.202	1.1→6.1	4.80	1.185	2.3→7.7	1.11	.951	-1.2→3.9
Woodworth	37	3.58	1.033	1.6→6.5	4.98	1.180	2.5→7.4	1.39	.798	- .1→3.8
Total (852/855)*	756	3.54	1.153	.7→7.9	4.64	1.301	1.5→8.9	1.10	.831	-1.7→3.9

Total Mathematics

School	N	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
DuVall	25	3.62	.926	2.0→5.9	4.57	.777	3.0→6.1	.94	.587	- .4→2.5
Henry Ford	36	3.83	.892	2.1→5.4	4.63	1.035	2.8→6.3	.82	.468	- .0→2.0
Wm. Ford	33	3.41	.759	2.5→5.5	4.01	.826	2.7→6.1	.60	.412	- .1→1.5
Haigh	42	4.00	.987	1.9→6.4	4.87	.821	3.0→6.3	.87	.641	- .8→2.1
Howard	36	4.33	.836	2.7→6.7	5.33	.849	4.1→7.1	1.00	.561	.0→2.2
Lindbergh	33	3.95	.698	2.4→5.4	4.94	.857	3.3→6.8	.99	.683	- .4→2.9
Long	35	4.11	1.033	2.4→5.7	4.88	1.003	3.3→6.4	.77	.464	- .5→1.8
Lowrey	86	3.23	.675	1.7→5.3	4.34	.821	2.6→6.1	1.11	.594	- .1→2.7
Maples	41	3.60	.650	2.2→4.7	4.59	.818	3.1→6.3	.99	.522	- .4→1.9
McDonald	59	3.35	.717	2.2→5.1	4.48	.874	3.0→6.5	1.14	.466	.1→2.2
Nowlin	26	3.43	.735	2.1→4.5	4.42	.862	2.9→5.6	.99	.403	.0→1.9
Oakman	40	3.69	.857	2.2→5.5	4.58	.884	2.9→6.2	.90	.513	- .8→2.2
River Oaks	33	3.85	.830	1.6→5.2	5.35	.963	2.6→7.7	1.51	.487	.8→3.1
Salina	81	3.30	.846	1.6→6.1	4.40	.824	2.8→6.9	1.09	.546	- .4→2.7
Snow	41	3.98	.829	2.6→5.7	5.03	1.032	2.9→7.6	1.05	.613	- .4→2.4
Whitmore-Bolles	71	3.76	.903	1.7→6.1	5.14	.874	3.2→7.3	1.36	.664	-1.0→2.5
Woodworth	37	3.54	.722	2.5→5.3	4.67	.825	2.6→6.5	1.13	.497	.0→2.2
Total	755	3.65	.868	1.6→6.7	4.69	.934	2.6→7.7	1.05	.581	-1.0→3.1

*The number of students tested for pretest was 852 and posttest was 855. Analysis was made on 756 "same" students who were both pretested and posttested.